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**Purple-producing Bacteria.**<sup>1</sup>—The Purpurbacteria make an interesting group with certain characteristics differing from the majority of these plants. Many bacteria, in fact most of them, grow best in the absence of light, but the group of the Purpurbacteria grow best or as well in its presence. Most pigment-producing bacteria show color production best or only in the free access of oxygen — the group under consideration have the opposite characteristic that they produce their color best or only in the absence or in a diminished supply of oxygen. The color of most bacteria is outside of the cell, but with this group it is in the bacterial cell for the most part.

The author has brought together the known facts in regard to this group, has added some new methods of cultivation, and has contributed descriptions of a number of new varieties isolated by himself. He has furthermore studied more fully the action of light and other conditions on their growth and pigment-producing powers, so that the physiological characteristics of the group are clearly presented in detail. The plates include two of photomicrographs of some of the new varieties described in the text, a presentation of the appearance of bacteriopurpurin crystals from one of them, the color scheme of bacteriochlorin and bacteriopurpurin — the first in alcohol and the second in bisulphuret of carbon — and a number of absorption spectra of the pigments from different members of the group. The book is an interesting and important contribution to the study of the subject.

H. C. ERNST.

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## GEOLOGY

**Rate of Recesson of Niagara Falls.**—Bulletin 306 of the United States Geological Survey, which has recently been issued,<sup>2</sup> is of much interest to the layman as well as to the student of geology. G. K. Gilbert traces the early development of the ideas that the falls are

<sup>1</sup> Die Purpurbakterien nach neuen untersuchungen. Eine mikrobiologische studie von Prof. Dr. Hans Molisch: Direktor des pflanzenphysiologischen institutes der K. K. Deutschen Universität in Prag. Mit 4 tafeln. Jena, Verlag von Gustav Fischer. 1907. pp. vii, 95, Octavo.

<sup>2</sup> Gilbert, W. K. and Hall, W. C. Rate of Recesson of Niagara Falls (by G. K. Gilbert) accompanied by a report on the survey of the crest (by W. Carvel Hall). *Bull. U. S. Geol. Sur.* No. 306, 1907. pp. 1-31, 11 plates, 8 figures.

receding upstream, that the gorge below the falls is the result of this recession, and that it would be possible, by sufficiently accurate observations, to determine the rate of recession. He then discusses the data upon which computations of the rate of recession must be based, consisting of surveys of the crest-line of the falls made in 1842, 1875, 1886, 1890, and in 1905; and camera-lucida sketches made in 1827. After considering the relative accuracy of the different surveys and sketches, and plating the results together, the author concludes that a gradual recession of the Horseshoe Falls is demonstrated, while a much slower rate of recession is indicated for the American Falls. These changes are strikingly represented by contrasted photographs and sketches made from the same view-point, but many years apart.

Concerning quantitative results of the study, the author points out that the available data may be treated in a variety of ways, and made to yield widely divergent results. The lack of harmony is due in part to inaccuracies in the surveys, some of which are unavoidable; and in part to the fact that the rate at which the limestone crest breaks away is necessarily irregular. Too much confidence should not, therefore, be placed in exact mathematical expressions of the rate of recession. In general, however, the evidence proves a recession of about 5 feet a year with a possible error of not more than 1 foot, for the Horseshoe Falls, in the sixty-three years from 1842 to 1905; and a recession of less than 3 inches a year for the American Falls, in the seventy-eight years from 1827 to 1905.

The time consumed in the total recession of the falls from their former position near Lewiston is not considered in this report, except that the author briefly notes some of the many variable factors which must be taken into account in estimating such time. A short report by W. Carvel Hall on the latest survey of the crest line of the falls is appended to the paper.

A sprinkling of "reformed" (one is tempted to say "deformed") spelling throughout the paper occasionally distracts the reader's attention from the matter itself to the manner in which it is presented.

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